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Dedicated to Quality Education

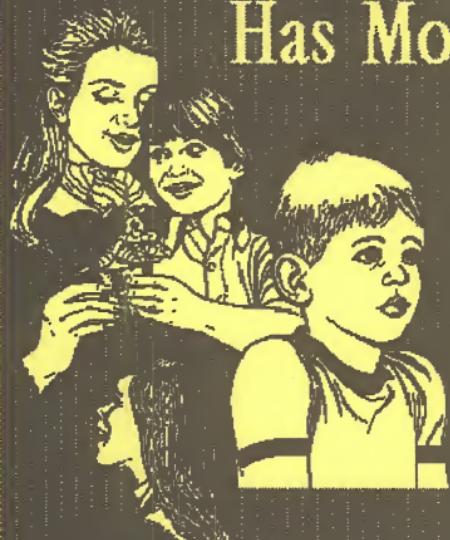
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MSTA Newsletter

volume 7 number 10

No Human Endeavor Has More Concern for Humanity than Science



Congratulations to
Patricia Able, Marilyn
Alexander, and Darlene
Ruble for being selected
Montana's 1989 Presiden-
tial Award Winners!



SECO IDEA EXCHANGE Call for Handouts

Teachers attending this year's SECO conference at Dublin High School will note an added feature: THE IDEA EXCHANGE. Teachers will be able to obtain copies of teaching tips, demonstrations, stories and other valuable ideas SECO will provide a file of submitted handouts that can be copied on site for a modest fee. This should be an excellent opportunity for members to share their favorite teaching ideas. We are presently compiling handouts for the IDEA EXCHANGE and asking members to submit a few good selections to us as early as possible. It would be really helpful if the handouts are marked as to appropriate subject area and grade level. Be sure to note the source of the idea if other than your own. Please forward handouts to: SECO IDEA EXCHANGE, 88 Ohio Ave., Tiffin, OH 44883.

SUMMER OFFERINGS AT WESTERN

The following are courses which Western Montana College of the University of Montana

intends to offer during summer school 1989 in the area of science and environmental education:

GSCI 104—Introduction to Life Science

GSCI 210—Science Skills Lab

BIO 491—Alpine Plant Ecology

BIO 491—Forest Ecology

BIO 491—Grassland Ecology

BIO 491—Aquatic Ecology

The University of Montana is offering a Master's of Education in Curriculum & Instruction on the Dillon campus beginning this summer. Following is a listing of the U of M courses being taught this summer:

EDUC 595—Project Wild Workshop

EDUC 595—Centennial Outdoor Education

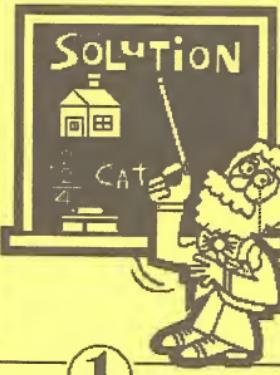
If you have any questions, please contact Susan K. Jones, Director, Continuing Education & Summer School, Western Montana College, Dillon, MT 59725.

**The main part
of intellectual
education is
not the acqui-
sition of facts
but learning
how to make
facts alive.**

—Oliver Wendell Holmes

HIGH SCHOOL SCIENCE STUDENT HONORS PROGRAM

In its fourth year of operation, the U.S. Department of Energy's Honors Program has expanded to sponsor seven separate programs. Since 1985, the Department's Honors Program has brought 676 U.S. high school students to four national laboratories for first-hand, state-of-the-art research experiences. This year, the program has been expanded to seven national research laboratories, and Montana will be



privileged to send seven of our best science students to take part in these very special and prestigious activities. Many past participants, now enrolled in college, commented on the importance of this experience in developing career goals in science and technology. Several of these students were able to return to the laboratories as summer research interns.

DOE High School *Supercomputer* Honors Program at the Lawrence Livermore National Laboratory in Livermore, California, June 17-July 1.

DOE High School *Physical & Life Science Research* Honors Program at Brookhaven National Laboratory in Upton, New York, July 26-August 8.

DOE High School *Particle Physics Research* Honors Program at the Fermi National Accelerator Laboratory near Chicago, Illinois, June 25-July 9.

DOE High School *Life Science* Honors Program at Lawrence Berkeley Laboratory in Berkeley, California, July 23-August 4.

DOE High School *Environmental Science* Honors Program at the Oak

Ridge National Laboratory in Oak Ridge, Tennessee, July 8-22.

DOE High School *Superconductivity* Honors Program at the Argonne National Laboratory, Argonne, Illinois, June 19-30.

DOE High School *Ecology* Honors Program at the Pacific Northwest Laboratory in Richland, Washington, June 17-July 1.

These programs are sponsored and funded by the Department of Energy. The Montana Office of Public Instruction coordinated the search, but final selection of participants was made by the Governor's Office.

We are also including information on the National Youth Science Camp in Charleston, West Virginia. Two more Montana students will have exemplary science experiences at the national level. This is not a DOE Honors Research Program.

Participants selected are as follows:

National Youth Science Camp: Winners are Jim Ramsey, Jr., Missoula; Todd S. Sperry, Missoula
Alternates: Sheldon Richards, Missoula; Wade Bick, St. Ignatius

DOE Supercomputer Honors Program: Winner is Gregory Lee Kiedrowski, Great Falls

Alternate: Jonathon David Denton, Kalispell.

DOE Particle Physics: Winner is Eric B Loftsgaarden, Missoula.

Alternate: Kevin Leslie Rugg, St. Ignatius.

DOE Superconductivity: Winner is Michael W. Frandsen, Missoula

Alternate: Leanne Nutter, Belgrade

DOE Life Science: Winner is Sara S. Sartorius, Helena.

Alternate: Patrick James Lager, Shelby

DOE Physical & Life Science.

Winner is Renee L. Doney, Helena

Alternate: Sarah Taubner, Missoula.

DOE Ecology.

Winner is Shauna R Richardson, Belgrade.

Alternate: Debbie L Adolphson, Belt.

DOE Environmental Science:

Winners are Tera L McCool, **Missoula**; David Robert Willis, Polson.

Great Job Students!

ARE YOU A STONE IN THE POND?

Ever so often, something comes across my desk that attracts more attention than normal. That was the case with a paper I received this past semester. A student teacher at Boise State had written the evaluation of the lessons she had taught. (You know, that horrible "assignment" that we require at the end of the workshop.) The observations she made are worth sharing.

"With my background being a little different from the majority of people here in Boise that took the course with me this semester, I would have to single out awareness as the number one strength of these lessons-and Project WILD in general.

"I grew up in North Africa. The time I have spent in the States has been spent in major cities, such as New Orleans and Houston. I was amazed at how much agony and damage could be done by leaving one piece of 'six-pack plastic' on a beach. I had never realized that hydroelectric dams threatened the very existence of Salmon and other fish.

"Many things that seemed so innocent before, I find out are threatening whole ecosystems. I found this same reaction in my students. Most people (and children) care; they just do not realize. I think it is very important that teachers find ways to integrate these lessons into their curriculum because, as with most things in life, knowledge is the key. Like the stone dropped in the lake, this knowledge (awareness) can spread from teacher to student, from student to friends and family members, from parents to office, etc. And if this knowledge is acted upon, just think of the ramifications...."

"... My final caution has to do with fun. Not only are many of these lessons fun for the students, but the teacher may be having too much fun also, and forget to watch the time."

Awareness, fun, knowledge and actions. Sounds to me like Krista has grasped the concepts of Project WILD.

Now, just think of the ramifications!

COMMUNITY OF LIVING THINGS

We have received first announcement of an exciting new program on videodisc entitled the "Community of Living Things" produced by WHRO Public Television and Radio, Norfolk, Virginia and the SYSCON Corporation. Most of you are already familiar with the award-winning videotape series of the same title produced by WHRO a few years ago.

WHRO Public Television and Radio and the SYSCON Corporation have cooperated in using advanced technologies to bring the "Community of Living Things" to you in an exciting new format. This new format makes the program interactively exciting for both students and teachers. For example, certain biological phenomena, which take place too rapidly in real time to even be adequately observed, can be slowed, repeated, measured and analyzed for better com-

Orcinus O. orca
"Orca (Killer Whale)"
9 meters



prehension using this new videodisc program. Because the program is keyed to broad conceptual themes, it has wide application to biology and life science programs nationwide.

The "Community of Living Things" videodisc provides the following exciting opportunities for the science classroom:

- ...Access to original closeup nature photography

- ...Ability to single frame motion sequences of biological activity and examine in detail anatomical structures

- ...Calculation of precise time required for biological processes

- ...Immediate access to a large variety of organisms

- ...Interfaceable with Hypercard and other computer authoring languages

- ...Two sound track learning levels; standard and advanced

- ...Closed captioned for the hearing impaired and **remedial** instruction

- ...On-screen discussion questions

- ...Visual database for a wide range of curriculum applications

For more information call 1-800-343-5365. To order, send your name and

address with a check or money order for \$145.00 (Include \$2.50 for shipping and handling) to: SYSCON Corporation, 2686 Dean Drive, Virginia Beach, VA 23452 Attn: Ginny Goetz. Make checks payable to SYSCON Corporation.

SUMMER SCIENCE SEMINARS

The Teton Science School runs a series of Adult Seminars each summer for personal and professional development (write for a catalog). These seminars are designed to enhance science and environmental education knowledge with information and practical field experiences. We have many very well respected teachers and excellent lab and field resources. These seminars are non-residential. Participants attend daily sessions or travel into the back country with their instructors. Some participants camp in the National Park Campground, others take a motel in town. For many of our seminars we offer academic credit through the University of Wyo-

ming or the University of Idaho.

We have an excellent reputation for high quality programming. We would like to expand our market to include Montana teachers. All of our seminars offer information and experiences that would be valuable to educators and our instructors are sensitive to the needs of all participants.

Math/Science funds could be used to send science teachers to these activities. For further information contact: Teton Science School, P.O. Box 68, Kelly, WY 83011-0068.

MONTANA CENTENNIAL OUTDOOR EDUCATION WORKSHOP

The University of Montana at Western Montana College, in cooperation with the Office of Public Instruction, Department of Fish, Wildlife and Parks, and the Montana Historical Society, present the Montana Centennial Outdoor Education Workshop on June 25-30, 1989, at the Birch Creek Nature Center (20 miles northwest of Dil-

ion in the beautiful Pioneer Mountain Range).

During Montana's centennial year, the University of Montana at Western Montana College offers two graduate quarter credits in Education 595, Montana Centennial Outdoor Education. The Montana Centennial Outdoor Education Workshop vibrantly illustrates how natural resources have impacted the history, lifestyles and economy of Montana.

The basic workshop fee is \$135 per person and includes food, lodging and workshop materials. The workshop fee of \$135 and the credit course registration fee must be paid by June 9.

Advance registration forms for the 1989 UM Summer Session are sent upon receipt of the course reservation form and must be completed and returned by May 19. Based on advance registration information, an invoice is sent to you; payment of this invoice for credit registration and the basic workshop fee must be received by June 9. Please make your course reservation early; advance registration is required.

For program information, contact: Spencer Sartorius, Program Coor-

dinator, Office of Public Instruction, State Capitol, Helena, MT 59620 (406) 444-4434.

Textbook/Resource and Material/Lab Equipment Money Available

The Conservation Districts Division of the Montana Department of Natural Resources is considering a textbook/resource and material/laboratory equipment cost-share program to subsidize public school purchases of applicable materials.

Ideally, purchased material would address the causes, effects, and solutions of point and nonpoint source pollution associated with urban runoff, agriculture, forestry, and mining in the context of traditional subject areas, i.e., earth science, biology, and chemistry. Some topics might include acid mine drainage, toxic metals, salinization, sedimentation, and riparian ecology and management.

Contact person is Frank Mastandrea, Resource Program Specialist, (406) 444-6672.

University of Montana Offers Summer Institute for Teachers

The college of Arts and Sciences will offer a Summer Science Institute for thirty of Montana's science teachers. Each selected participant will receive a waiver of tuition and fees as well as support for required course materials. Participants will reside on campus during institute days with room and board provided. The following courses will be offered for a total of six graduate credits: *Plants of Montana*, *Fossils of Montana* and *Environmental Chemistry*. In addition, special evening lectures will be presented. The Institute will be scheduled for three days per week for three weeks, beginning on June 20, 1989.

If you did not receive a direct mailing, write or call David Bilderback, Acting Associate Dean, College of Arts and Sciences, University of Montana, Missoula, Montana 59812, (406) 243-2632.

SCHOLARSHIPS FOR AVIATION/AEROSPACE TEACHERS

The Montana Aeronautics Division is sponsoring six college Aviation/Aerospace Teacher Workshops. Scholarships valued at \$100, which help defray tuition and provide for an actual flight experience, will be awarded to up to 30 Montana school teachers at each workshop. The workshops will be conducted at various times between June 9 and June 30, 1989.

For more information or to register, contact any of the following:

University of Montana, Continuing Education Department, Missoula, MT 59801 (workshops in Missoula and Great Falls)

Montana State University, Continuing Education Department, Bozeman, MT 59715

Eastern Montana College, Continuing Education Department, Billings, MT 59101

Dawson County Community College, Registrar, Glendive, MT 59330

Carroll College, Registrar, Helena, MT 59601

Montana Aeronautics Division, P.O. Box 5178, Helena, MT 59604

HANDS-ON LABORATORY ACTIVITIES IN SCIENCE FOR THE CLASSROOM TEACHER

JUNE 22, 23, 24TH
NORTHERN MONTANA
COLLEGE HAVRE, MT

A LABORATORY ORIENTED "HANDS-ON" APPROACH TO SCIENCE INSTRUCTION THAT WILL INVOLVE A VERY "INFORMAL" SUMMER SETTING IN WHICH SOME OF MONTANA'S VERY BEST SCIENCE INSTRUCTORS WILL SHARE WHAT THEY ARE DOING CURRENTLY IN THEIR CLASSROOMS.

INSTRUCTION AND PRESENTATIONS IN THE WORKSHOP WILL BE GIVEN BY SCIENCE TEACHERS ACTIVELY INVOLVED IN DAY-TO-DAY SCIENCE INSTRUCTION HERE IN MONTANA. THE COURSE IS DESIGNED FOR TEACHERS GRADES 4-12. CALL NMC AT 1-800-662-6132 (ASK FOR THE SUMMER SESSIONS DIRECTOR) AND MAKE PLANS TO SIGN UP NOW AS THE COURSE DOES HAVE LIMITED OPENINGS AND IS FILLING UP QUICKLY!

FOR MORE INFORMATION CONTACT DAVE PUYEAR, SCIENCE INSTRUCTOR AT BLUE SKY SCHOOLS ON THIS BOARD.



*In
Science,
Things
are
seldom
what
they
seem
for
long.*

**Distribution of Blood Types O, A, B, AB
Among Peoples of the World**

Population	Number	O	A	B	AB
European					
England (eastern counties)	1,000	43.2	47.7	8.3	1.4
Copenhagen, Denmark	1,261	40.7	45.3	10.5	3.5
Detroit, U.S.A.	5,000	44.5	36.1	14.3	5.2
Berlin, Germany	1,227	40.0	39.5	15.1	5.4
Leningrad, U.S.S.R.	1,176	43.1	33.1	19.8	4.6
Asiatic					
Buriat of Irkutsk, U.S.S.R.	1,320	32.4	20.2	39.2	8.2
Canton, China	992	45.9	22.8	25.2	6.1
United Provinces, India	2,357	30.2	24.5	37.2	8.1
Ainus of Sakhalin	1,141	25.7	28.0	34.8	11.5
Tokyo, Japan	29,799	30.1	38.4	21.9	9.7
Southwest Pacific					
Sudanese of Semarang (Indonesia)	682	38.7	23.2	31.0	7.3
Moros, Philippine Islands	442	41.6	23.1	30.3	5.0
Native Australians, Queensland	377	60.3	31.7	6.4	1.6
African					
Balese, Belgian Congo	507	48.5	30.8	16.4	4.3
Pygmies, Belgian Congo	1,302	30.6	30.3	29.4	10.0
Zulus, South Africa	500	51.8	24.6	21.6	2.0
American Negroes, New York	730	44.2	30.3	21.8	3.7
Ambon, Melanesia	1,471	55.9	20.9	20.9	2.3
Bushmen, South Africa	268	60.4	28.0	7.8	3.8
Hottentots, South Africa	506	34.8	30.6	29.2	5.3
Oceanic Peoples					
Palau, Micronesia	545	58.9	26.4	12.3	2.4
Yap, Micronesia	213	57.7	20.3	17.8	4.2
Hawaii	413	36.5	60.8	2.2	0.5
American Indian					
Eskimos, Greenland	607	54.2	38.5	4.8	2.0
Navahos, North America	622	69.1	30.6	0.2	0
Blackfeet, North America	235	45.5	50.6	2.1	1.8
Mayas, Central America	738	76.5	16.7	5.4	1.4
Mapuches, South America	382	75.6	17.2	6.2	0.6



**"Wolf Pac!"
for Teachers Available Soon!**

A new series of curriculum materials is currently in production by the National Park Service and the Denver Museum of Natural History. "Wolf Pac!" is designed to help teachers and parents, together with their children, learn more about one of the most fascinating and controversial animals in North America, the gray wolf. "Wolf Pac!" consists of

several publications about wolves as well as activities for young people targeted to grade levels K-4, 5-8, and 9-12.

"Wolf Pac!" includes the following items: Booklets: *Wolves*, by Wexo, Wildlife Education, San Diego, CA.

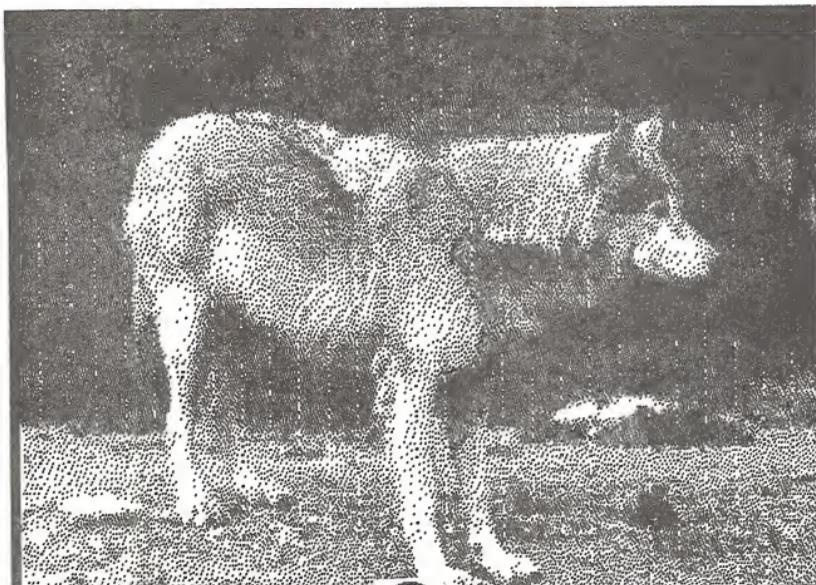
Looking at the Wolf, the Teton Science School, Rober Rinehart Publishers, Boulder, CO

Wolf Discovery in the Northern Rocky Mountains, Tilt & Eno,

National Audubon Society, New York, NY

Activity Guides. *The Wonder of Wolves-Story & Activities*, by Sandra Chisholm Robinson, the Denver Museum of Natural History, Roberts Rinehart Publishers, Boulder, CO. (for parents and children)

Getting to Know the Wolf-A Teachers Guide, by Joseph W. Zarki, the Yellowstone Association, Roberts Rinehart Publishers, Boulder, CO. (for teachers)



How to Transplant Seedlings from Flats to Pots

Introduction: The purpose of this module is to assist you in developing the skills needed to transplant a variety of types of seedlings from flats into three types of pots (peat, clay, and plastic), and to obtain 11 healthy plants from each 12 seedlings transplanted. *

Materials:
builder's sand
peat pots
clay pots
plastic pots
plant markers
selected plants



tablespoon, teaspoon
sterile potting soil
peat moss
vermiculite
5-10-5 fertilizer, dry
broken pieces of clay
pots

Procedure:

1. Mix equal portions of peat moss and vermiculite, double portions of sand and potting soil, and 7-8 gm 5-10-5 fertilizer per 2 1/2 liters of soil mix.
2. One day before transplanting thoroughly water the flats containing the seedlings to be transplanted.
3. Peat Pots: Are generally used when the seedlings are going to be planted in a larger container at a later date or into a garden. The peat pot allows you to transplant without disturbing the root system.
4. Plastic Pots: Help the soil retain moisture by reducing evaporation. They are used frequently with plants that require constant moisture levels or higher levels than is normal. They are also used for plants that are transplanted at a later date. In addition, they are reuseable.
5. Clay Pots: Are also reuseable, but with clay pots the moisture in the soil evaporates more quickly due to the porous clay. As a result, this pot is often the choice for plants requiring dryer

conditions or well-drained soil. Clay pots can also be used for transplanting at a later date.

- No special procedures are required to prepare peat pots for transplanting seedlings. Fill the pot from 1/4 to 1/3 full with the prepared soil mixture.
- Plastic pots require additional preparations if the drainage holes at the bottom are very large; then they must be blocked to prevent the soil mixture from leaking out. This may be done with a broken piece of clay pot or a small stone. This does not prevent soil drainage.
- To prepare clay pots for planting, soak in water at room temperature for about 45 minutes. After soaking, block the drainage hole with the piece of pot or stone. Plastic or peat pots do not require presoaking.
- To commence planting, fill each pot 1/4 to 1/3 full of soil mixture. All the pots required should be prepared before you remove any seedlings from the flats.
- Before transplanting the seedling, test the soil in the flats for moisture content. The soil should be moist. If dry, water lightly before transplanting. If the soil is too wet, wait another day before transplanting.
- Seedlings must be handled carefully to avoid injuring the delicate root system. Gently loosen the soil around each plant with a fork.
- After the soil around the seedling has been loosened, select a plant at the end of a row. For seedlings with large root systems such as bean, moonflower or plum, slowly insert a tablespoon into the soil about 5-7 cm from the base of the plant.
- Lift the plant out of the soil. Push the spoon gently under the root system and use your other hand to gently disintangle roots from adjacent seedlings. Do not rip the roots out of the soil.
- Transplant one seedling at a time, keeping as much soil around the roots as possible to prevent the roots from drying out.
- Place the root system and soil in the palm of one hand. Steady the plant with the other hand by grasping a leaf. Do not grasp a stem.

16. Gently lower the seedling into a prepared pot. Make sure there is at least 1 cm between the root ball and sides of the pot.
17. Observe the position of the soil line. It should be about 1-2 cm below the lip of the pot. This will allow room for top watering.
18. Gently work additional soil mixture around the root ball, making sure there are no air pockets in the soil. Do no pack the soil, which will hinder growth and may kill the plant.
19. The soil line should be the same as the previous soil line while the seedling was in the flat.
20. For some plants, like moonflower, which are climbers, support stakes must be installed. Stakes should be inserted next to the lip of the pot and pushed down until the stake touches the bottom.
21. Tie the seedling to the stake by placing a piece of string around the stem below the true leaves. Cross the string in front of the stem, but do not pull it tight.
22. Loop the ends of the string around the stake and tie them together. The string should now be in a loose figure eight configuration around the stem and stake.
23. For medium-sized seedlings like zinnia, follow the same procedure as described for larger seedlings. Since the root system is smaller, you may use a smaller size pot if desired.
24. For small seedlings like sweet majoram or white clover, use the same procedure as described, except use a teaspoon and insert it about 2-3 cm from the base of the seedling.
25. After transplanting all the seedlings from a flat, identify each pot with a plant marker. Include the name and date transplanted. Water each pot thoroughly with water at room temperature.

***Adapted from the American
Institute of Biological Sciences, Project Bioteck**

**This is the 3rd in a series of articles to help you grow
plants for school or home use with better results.**

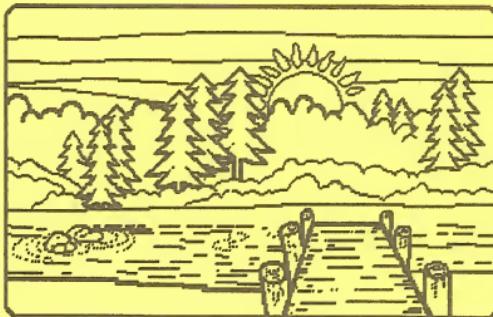
**Richard A Menger, MST, Green Jeans Horticulture,
Outdoor Classroom Project, Baker High School
(406)778-3329**

When we do focus
our
attention
in a
certain
direction,
what we see is
always limited by
the vision we bring
to our investigation.



MSTA Board Members
and Regional Directors
Wishing You a Very Happy
Summer!

Postage



To:

MSTA will help the individual participate in determining the destiny of science in Montana. The organization serves as a vehicle for educators from all professions to exert positive influences on young people. Many important decisions concerning the scope and direction of science education will be strongly influenced by our organization.

MSTA goals are to increase public awareness, interest and support of science education in Montana.

Montana Science Teachers Association



Membership Category:

1 year	\$ 10.00
2 years	\$ 17.00
3 years	\$ 24.00
Life	\$100.00
Student/Retired	\$ 5.00

Membership dues are \$8.00 and are payable to Gil Alexander, Treasurer, Helena High School, Helena, Montana 59601. Membership includes a one-year subscription (4 issues) to *The Montana Science Teacher*.